Tropical Cyclones

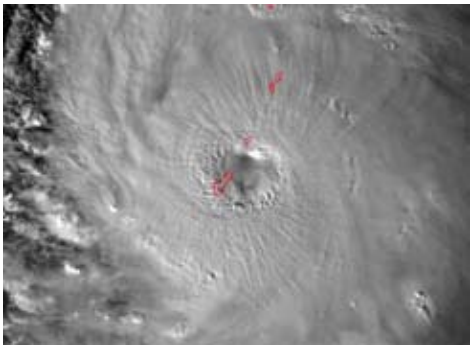
When the warning sirens blare and the wind picks up, what could we really be in-store for?

Description: A tropical cyclone is an organized tropical weather system of strong thunderstorms and well-defined circulation. Tropical cyclones with sustained winds of less than 38 mph are called tropical depressions. Once sustained wind speeds reach 39–73 mph they are referred to as tropical storms. Within the PACN, storms with sustained winds of 74 mph or greater are termed hurricanes in Hawaii, typhoons in the Marianas and severe tropical cyclones in American Samoa.

Tropical cyclones are products of (1) warm ocean waters (at least 80° F), (2) warm and moist atmosphere, (3) a distance of at least 300 miles from the equator for sufficient Coriolis force, and (4) suitable near-surface and vertical wind shear conditions. However, many instances of favorable conditions do not develop into tropical cyclones.

Occurrence in the Pacific Islands: In Guam and the Northern Mariana Islands tropical cyclones of Saffir-Simpson scale 1 strength or greater occur throughout the year. In Hawaii and American Samoa, they tend to occur during defined seasons (Hawaii: May – Oct.; American Samoa: Nov. - April). The western Pacific Ocean experiences far more tropical cyclones than the rest of the Pacific Ocean (see map). Yet the entire network region is susceptible; the frequency is dependent upon the presence of suitable conditions for formation and wind conditions that guide the path of an existing storm.

Destructive Forces of Tropical Cyclones: Tropical cyclones pose a variety of threats, which can extend hundreds of miles from the storm's center. Destructive forces include strong winds, heavy rains, flooding from runoff or from storm surge, and tornadoes. Islands are especially impacted due to finite land and coastal zone areas. The destruction of coral reefs leads to loss of biodiversity and robs the islands of natural protection from minor storms.



Super Typhoon Pongsona over the Mariana Islands, December 8, 2002. The term "super typhoons" refers typhoons with sustained 1-minute winds of at least 150 mph.

Nutrient cycles are changed because tropical cyclones are significant drivers of erosion and deposition along coastal and inland waterways, as well as causing extensive defoliation. Salt stress, wind stress and flooding cause habitat alterations that particularly impact rare species or those with confined geographic ranges. Furthermore, these changes often facilitate the spread of alien species. Tropical cyclones also have a bearing on human populations and cultural resources as the storms threaten lives and alter physical structures such as homes, monuments, or seawalls.

Management Considerations: Public safety is the primary management consideration before, during, and after tropical cyclones. The passing of Super Typhoon Pongsona in the Mariana Islands in 2002 provides an excellent example of the effectiveness of education and preparedness. Despite sustained winds of over 150 mph, and the eye, or center of the storm, stationary over the island of Guam for over two hours, human fatalities were nil. Immediately after the storm, hotel mattresses were strewn over the beaches, the island's fuel depot was set ablaze by storm-generated static electricity, and the visitor center at War in the Pacific National Historical Park was damaged beyond repair. Yet strong preparations and the public acumen during the storm prevented the loss of life and allowed emergency responders and managers to focus on other pressing concerns.

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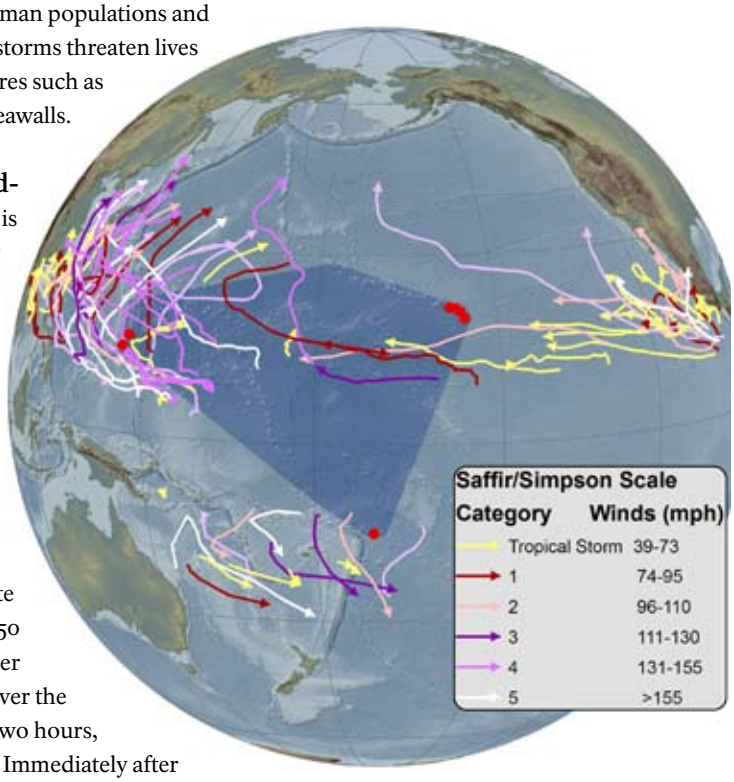
How you can stay prepared:

We can all do our part to educate ourselves about the hazards presented by tropical cyclones, and plan and prepare for them. A wide variety of valuable, local awareness and preparedness information is available through local meteorological and public safety offices and you can stay informed by tuning in to your local news (paper, radio, or TV). Regional advisory centers coordinate forecasts. For updates and more information:

http://www.nws.noaa.gov/om/hurricane/
http://www.prh.noaa.gov/hnl/cphc/
http://www.met.gov.fj/
http://www.jma.go.jp/en/typh/



Tropical Cyclone tracks in the Pacific basin during 2002–2003. Line color designates the maximum intensity reached during the life of the storm. Islands of the Pacific Island Network identified by a red dot.